Si9140 Demonstration Board

FEATURES

- V_{IN} = 5 V
- V_{OUT} = 2.0 to 3.5 V in 0.1 V Increments
- 5-μs Transient Response Time
- $I_O \leq$ 10 A
- Switching Frequency ≈ 400 kHz
- 100-kHz Closed-Loop Converter Bandwidth

DESCRIPTION

The Si9140 demonstration board has been developed to assist designers to meet the full static and transient load regulation requirements of high performance micro-processors. The demonstration board is designed to regulate the output voltage within ±0.07 V for a 10-A step load. The converter output voltage can easily be set to the desired voltage (2.0 to 3.5 V in 0.1-V increments) by adjusting the four sets of binary switches (S1). The switch in the up position represents 0 = GND and in the down position represents 1 = open. (See layout diagram for switch orientation.) Table 1 shows the switch setting for various output voltages. The demonstration board is capable of handling up to 10 A of continuous output current. An additional MOSFET, input capacitor, and larger inductor are required to handle currents beyond 10 A. The schematic of the demonstration board is shown in Figure 1. The Bill of Material and Component Vendor List are also provided to minimize the designer's effort.

The demonstration board layout is available in Gerber file format. Please contact your Vishay Siliconix sales representative or distributor for a copy.

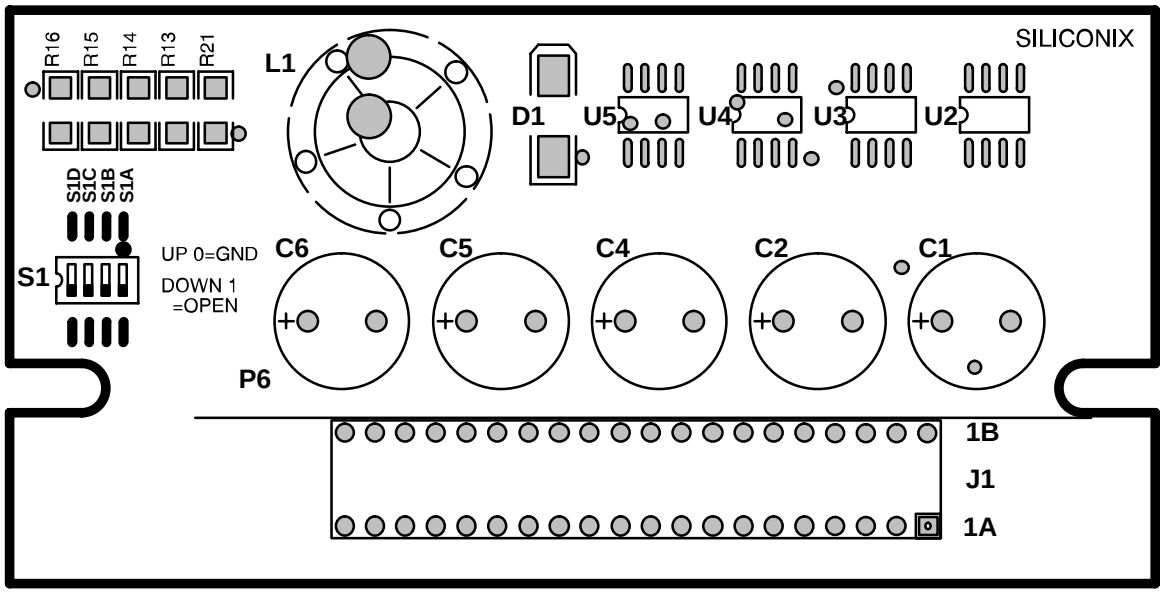
ORDERING INFORMATION: PART NUMBER SI9140DB

POWER-UP CHECK LIST–INSTALLED IN VRM MOTHER BOARD SOCKET

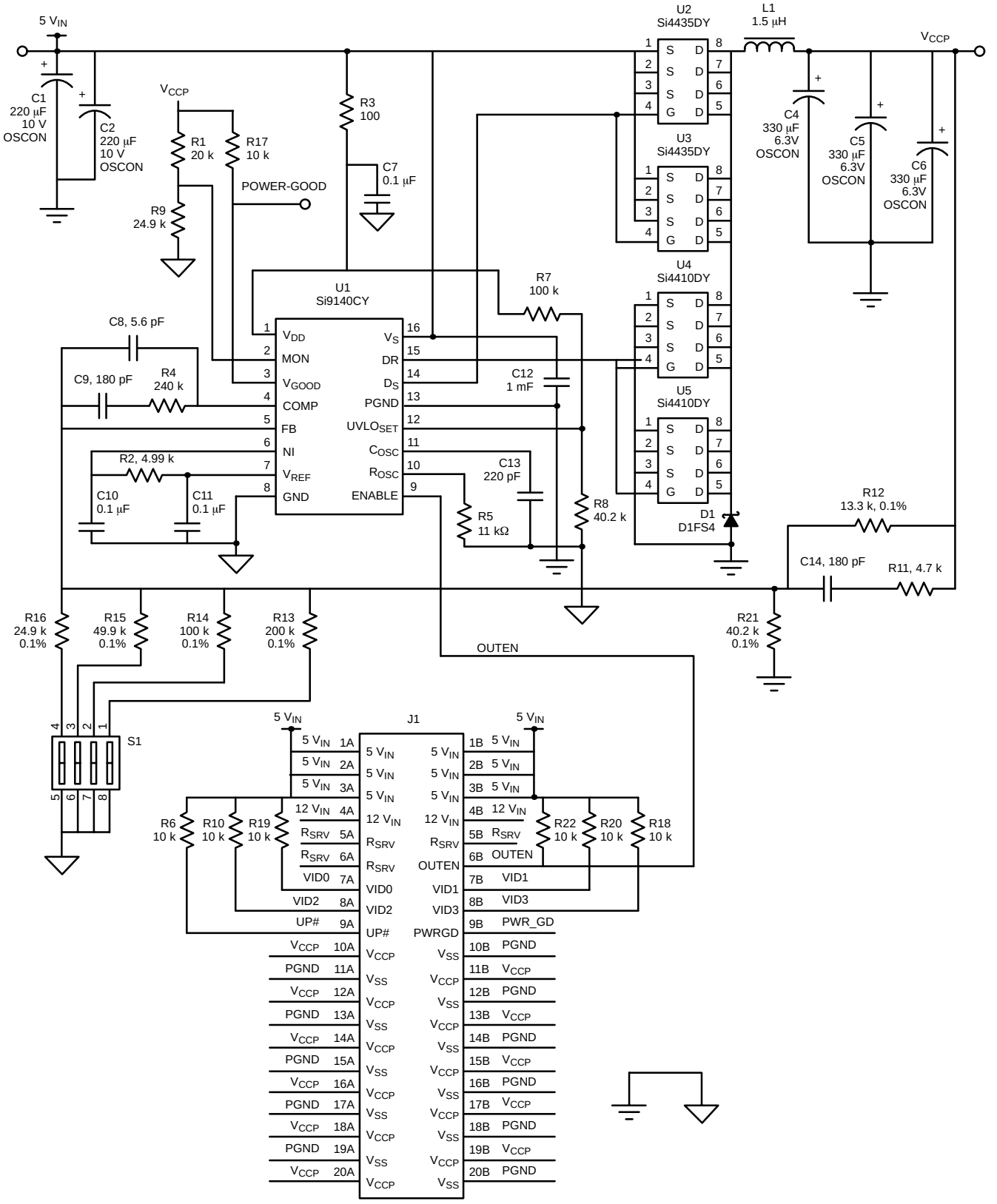
1. Verify that the microprocessor is decoupled with at least 400 μF of capacitance.
2. Adjust the dip switch positions to set the proper processor voltage as described in Table 1.
3. Turn on the main ac/dc converter to verify that +5-V input voltage is within the regulation tolerance before connecting the power supply module.
4. Turn off the main ac/dc converter and connect the power supply module to the mother board.
5. Unplug the CPU and turn on the power to the main ac/dc converter.
6. Verify that the Si9140 converter output voltage is regulating within the set voltage.
7. Power off the main ac/dc converter.
8. Insert the CPU and re-power the main ac/dc converter.

TABLE 1: S1 SWITCH SETTING FOR VARIOUS OUTPUT VOLTAGES

S1 Switch Setting				
S1D (R16)	S1C (R15)	S1B (R14)	S1A (R13)	V_{OUT}
1	1	1	1	2.0
1	1	1	0	2.1
1	1	0	1	2.2
1	1	0	0	2.3
1	0	1	1	2.4
1	0	1	0	2.5
1	0	0	1	2.6
1	0	0	0	2.7
0	1	1	1	2.8
0	1	1	0	2.9
0	1	0	1	3.0
0	1	0	0	3.1
0	0	1	1	3.2
0	0	1	0	3.3
0	0	0	1	3.4
0	0	0	0	3.5



SI9140CY DEMO BOARD SCHEMATIC



BILL-OF-MATERIAL						
Part	**Used**	**Designators**	**Description**	**Pattern**	**Part Number**	**Vendor**
1	2	C1, C2	220 μF/10 V OS-CON	F	10SA220K	Sanyo
2	3	C4, C5, C6	330 μF/6.3 V OS-CON	F	6.3SA330K	Sanyo
3	3	C7, C10, C11	0.1 μF		VJ0805Y104KXAAT	Vishay Vitramon
4	1	C8	5.6 pF		VJ0805A5R6KXAAT	Vishay Vitramon
5	2	C9, C14	180 pF		VJ0805A181KXAAT	Vishay Vitramon
6	1	C12	1 μF/25 V Ceramic		12063G105ZAT2A	AVX
7	1	C13	220 pF		VJ0805A221KXAAT	Vishay Vitramon
8	1	D1	D-64, 1.1 A, 40 V	IF	D1SF4	Shindegen
9	1	J1	40-Pin Connector	AMPMOD2	2-535512-5	AMP
10	1	L1	1.5 μH, 10 A	OD = 0.63” HT = 0.32”	CTX07-12877-X1	Colitronix
11	1	R1	20 k, 1%		CRCW08052002FRT	Vishay Dale
12	1	R2	4.99 k, 1%		CRCW0805499JRT	Vishay Dale
13	1	R3	100		CRCW0805101JRT	Vishay Dale
14	1	R4	240 k		CRCW0805244JRT	Vishay Dale
15	1	R5	11 k, 1%		CRCW08051102FRT	Vishay Dale
16	7	R6, R10, R17, R18, R19, R20, R22	10 k		CRCW0805103JRT	Vishay Dale
17	1	R7	100 k, 1%		CRCW08051003FRT	Vishay Dale
18	1	R8	40.2 k, 1%		CRCW08054022FRT	Vishay Dale
19	1	R9	24.9 k, 1%		CRCW08052492FRT	Vishay Dale
20	1	R11	4.7 k		CRCW0805472JRT	Vishay Dale
21	1	R12	13.3 k, 0.1%		TNPW12061332BT-9	Vishay Dale
22	1	R13	200 k, 0.1%		TNPW12062003BT-9	Vishay Dale
23	1	R14	100 k, 0.1%		TNPW12061003BT-9	Vishay Dale
24	1	R15	49.9 k, 0.1%		TNPW12064992BT-9	Vishay Dale
25	1	R16	24.9 k, 0.1%		TNPW12062492BT-9	Vishay Dale
26	1	R21	40.2 k, 1%		CRCW08054022FRT	Vishay Dale
27	1	S1	SW DIP-4, Pole Switch	SMT-8 0.05 Pitch	GDH045	Alco Switch
28	1	U1	SO-16	PWM IC	Si9140CY	Vishay Siliconix
29	2	U2, U3	SO-8	P-Ch MOSFET	Si4435DY	Vishay Siliconix
30	2	U4, U5	SO-8	N-Ch MOSFET	Si4410DY	Vishay Siliconix
31	5	302–200 BIVAR for OS-CON Caps	Spacers		302-200BNAR	Sanyo
			220 μF	E	TPSE227M010R0100	AVX
			330 μF	E	TPSE337M006R0100	AVX